

Expanding the K2 Legacy

Derek Buzasi

Florida Gulf Coast University

The project proposed here has three mutually supportive goals. First, we will extract light curves and measure rotation periods and photometric activity levels for all bright ($V < 12$) solar analogs in the C6 and C7 fields, a total of 1326 stars. This work expands on our existing Kepler analysis, and the use of new fields will allow us to compare different stellar populations and to provide a growing sample of test data for the study of stellar activity, rotation, and gyrochronology. Second, starting with our target frames, but extending to the entire C6 and C7 approved target list, we will extract and make publicly available light curves for all of the background sources with $Vr16$ in the C6 and C7 postage stamps. Our pipeline to perform this work already exists, and we anticipate the outcome of our work to approximately double the number of K2 stars for which light curves are available. Third, we will search for short-period planets ($P < 37$ d) in our sample of solar analogs. Based on our experience with the Kepler database, we anticipate finding 25-30 new exoplanets in the sample, including several hot Jupiters. The efficiency of our planet search will be improved by the adoption of criteria which allow us to identify the most promising planet host candidates based on photometric criteria alone. All portions of the project will involve significant student involvement as well as an informal science education component led by the Co-I. We proposed a related version of this project for Campaigns 4/5 and were allocated 143 long-cadence targets in Campaign 4 (and an as-yet-unknown number of targets in Campaign 5), but no funding.

The K2 mission has in a short time proven to be a successful successor to Kepler despite limitations in both pointing and observational duration. The light curves we will produce and release will include a wide variety of different kinds of objects, including potentially source types we have not yet seen with either Kepler or K2, and thus will be of the broadest scientific interest and relevance to NASA science objectives. Our educational and public outreach components will further contribute to the significance of the proposed project to NASA.